

## System for transmitting self-checking information of a vehicle to an accident service providing system

Patent Number: EP1094429  
Publication date: 2001-04-25  
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Requested Patent: ☐ EP1094429, A3  
Application Number: EP20000122453 20001013  
Priority Number(s): KR19990045172 19991018; KR19990058080 19991215; KR20000037662 20000703  
IPC Classification: G08G1/127  
EC Classification: G08G1/127, G08G1/123M2  
Equivalents: JP2001184578  
Cited patent(s): US5311197; EP0748727; EP0737952; US4989146; WO9914722; EP0915443; FR2769775

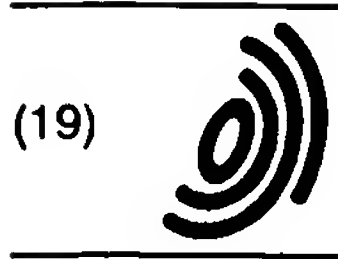
### Abstract

A self-checking information transmitting and accident processing service providing system which checks information about the defect and accident of a vehicle at a remote place, and promptly provides an accident processing service, thereby reducing the damage which is occurred by the accident. The system according to the present invention comprises a self-checking information transmitting system which detects and transmits the breakdown and the accident of the vehicle and an accident processing service providing system. The accident processing service providing system provides information about the location of the vehicle to an accident processing office. . Therefore, an accident can be prevented, and the life

and fortune of the driver can be protected.



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(11) **EP 1 094 429 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
25.04.2001 Bulletin 2001/17

(51) Int. Cl.<sup>7</sup>: **G08G 1/127**

(21) Application number: **00122453.4**

(22) Date of filing: **13.10.2000**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE**  
Designated Extension States:  
**AL LT LV MK RO SI**

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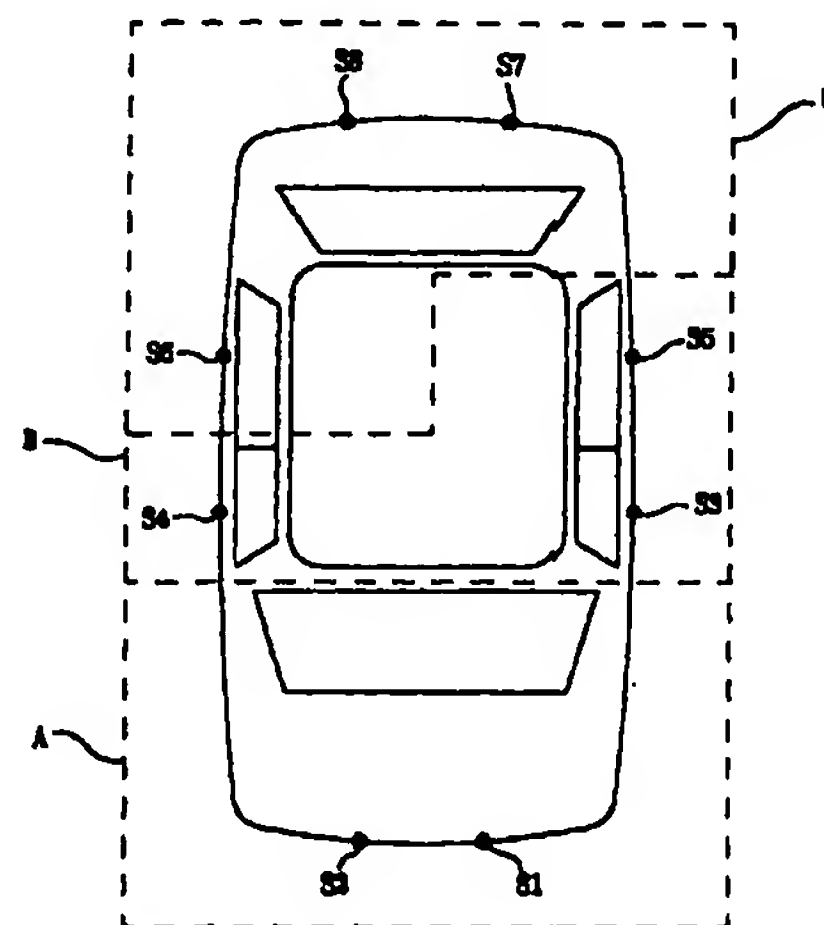
(30) Priority: **18.10.1999 KR 9945172**  
**15.12.1999 KR 9958080**  
**03.07.2000 KR 0037662**

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(54) **System for transmitting self-checking information of a vehicle to an accident service providing system**

(57) A self-checking information transmitting and accident processing service providing system which checks information about the defect and accident of a vehicle at a remote place, and promptly provides an accident processing service, thereby reducing the damage which is occurred by the accident. The system according to the present invention comprises a self-checking information transmitting system which detects and transmits the breakdown and the accident of the vehicle and an accident processing service providing system. The accident processing service providing system provides information about the location of the vehicle to an accident processing office. . Therefore, an accident can be prevented, and the life and fortune of the driver can be protected.

Fig. 2



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## Description

## BACKGROUND OF THE INVENTION

## 5 1. Field of the Invention

[0001] The present invention relates to a vehicle, and more particularly to a self-checking information transmitting device which checks the defect and accident of a vehicle and provides the result to an accident processing service providing system by a radio communication network and an accident processing service providing system which receives  
10 information about the defect and the accident and provides a suitable accident processing service.

## 2. Description of the Prior Art

[0002] A vehicle provides much convenience to our life, but can generate a loss of lives and properties when a heavy accident is occurred. Generally, a vehicle accident is occurred by the carelessness of a driver, the drunk driving, and the over-speed driving. When an accident is occurred, most drivers are panicked and cannot process the accident at once, and the accident situation becomes deteriorated.

[0003] Generally, a vehicle has a device which alarms the checking of an engine by flashing an engine alarming light when the engine is out of order. However, most drivers neglects the alarm of the vehicle, and an accident can be  
20 generated.

[0004] If an accident is occurred, the drivers usually use a service of an insurance company. However, in order to receive the service of the insurance company, the driver should inform the insurance company of the generation of the accident. Further, if the driver and the passengers are seriously wounded and cannot inform the insurance company of the accident, the time for processing the accident is delayed, and the situation is deteriorated.

## 25 SUMMARY OF THE INVENTION

[0005] The present invention has been made to solve the above-mentioned problem, and accordingly it is an object of the present invention to provide a self-checking information transmitting device which checks the defect and accident of a vehicle and provides the result to an accident processing service providing system by a radio communication network.  
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[0006] It is another object of the present invention to provide an accident processing service providing system that receives information about the defect and the accident and provides a suitable accident processing service.

[0007] In order to achieve the first object of the present invention, the present invention provides a system for transmitting self-checking information of a vehicle, which is mounted to the vehicle for providing an emergency situation of the vehicle to an accident processing service providing system, which comprises: an engine control unit for detecting and providing information about traveling and breakdown of the vehicle; a scanner for encoding and providing the information provided from the engine control unit; a plurality of sensors mounted to the outside of the vehicle, for measuring and providing an impact of the vehicle; a position information providing section for receiving and providing information  
40 about the present location of the vehicle; a first data converting section for encoding and providing the information provided from the scanner, the sensors, and the position information providing section; a second data converting section for converting code values provided from the first data converting section to a protocol type suitable for the radio communication network transmitting; and a first information transmitting and receiving section for transmitting the code values provided from the second data converting section to the accident processing service providing system.

[0008] In order to achieve the second object of the present invention, the present invention provides a system for receiving information about breakdown and accident of a vehicle from a self-checking information system of the vehicle and providing an accident processing service, which comprises: a second information transmitting and receiving section for receiving information about position, breakdown, and accident of the self-checking information system of the vehicle which is transmitted through the radio communication network; a restoring section for restoring and providing  
50 the information about breakdown and accident of the second information transmitting and receiving section; a position information providing section for receiving and providing information about the present position of the vehicle provided from the restoring section; an accident grade determining section for combining the information about accident and breakdown of the vehicle provided from the restoring section and determining and providing an accident degree and a breakdown degree; and an accident processing service controlling section for determining an accident processing service according to the information about the accident and breakdown degrees and informing an accident processing office  
55 which is located in the vicinity of the vehicle

# BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The above and other objects and advantages of the present invention will become readily apparent by reference to the following detailed description when considered in conjunction with the accompanying drawings wherein:

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FIG. 1 is a block diagram of a self-checking information transferring and accident processing service providing system of a vehicle according to the present invention; and

FIG. 2 is a view for showing the state of sensors which is mounted to determine the accident degree.

## 10 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0010] Hereinafter, a preferred embodiment of the present invention will be explained in detail with reference to the attached drawings.

[0011] FIG. 1a is a block diagram of a self-checking information transmitting system of a vehicle that is mounted to the vehicle to transmit information about whether a breakdown or an accident is occurred. FIG. 1b is a block diagram of an accident processing service providing system that receives information transmitted from a breakdown or accident vehicle and provides an accident processing service.

[0012] Referring to FIG. 1a, an ECU 110 detects traveling information, the RPM of an engine, the speed of the vehicle, and information about whether the vehicle is gotten out of order, for example, the temperature value of the cooling water, the angle value of a throttle valve, the oxygen sensor value, or the like, and provides the information to a scanner 115. The method for detecting the information in the ECU can be understood by one skilled in the art, and the specification omits the explanation about the method.

[0013] The scanner 115 which is connected to the ECU 110 encodes the values which is detected in the ECU, and provides the result to a first data converting section 140. The result is displayed so that a driver sees the result.

[0014] A plurality of sensors 120 is installed to the outside of the vehicle, for example, to the side surface, the front surface, and the rear surface of the vehicle, respectively. The sensors 120 are impact sensors, and detect the impact when the vehicle is bumped and provides the impact value to the first data converting section 140.

[0015] A position information providing section 125 is installed in the vehicle. The position information providing section 125 provides the present location information which is provided from a satellite to the first data converting section 140. An ID (Identifier) is provided to the vehicle. In the specification, the ID information is provided from a vehicle ID providing section 130, but it can be stored in the first data converting section 140 or another device.

[0016] The first data converting section 140 encodes self-checking information, i.e., the values detected from the ECU, the impact values of the sensors, and the present location information of the vehicle, and provides the information to the second data converting section 145.

[0017] The second data converting section 145 receives the code values which are provided from the first data converting section 140, and transmits the code values through a radio communication network, e.g., a CDMA (Code Division Multiple Access) network or a TDMA (Time division Multiple Access) network. The second data converting section 144 converts the code from the first data converting section 140 according to the protocol which is used in the radio communication network. A predetermined error correcting code is added to the code of the first data converting section 140 to prevent the error which can be generated when the data is transmitted through the radio communication network and an encoded code is provided to the first data converting section 140 to prevent the wire tapping.

[0018] The first information transmitting and receiving section 150 transmits the self-checking information of the vehicle which is provided from the second data converting section 145, the present location information of the vehicle, and the code values about the vehicle ID information to the accident processing service providing system shown in FIG. 1b, through the radio communication network, and informs the user of the information transmitted from the accident processing service providing system, i.e., the letter information and the voice information, and transmits the user selecting information to the accident processing service providing system.

[0019] The accident processing service providing system of FIG. 1b receives the information from the vehicle to which the self-checking information transmitting system of FIG. 1a, and detects the breakdown and the accident of the vehicle, and provides a message (a letter message or a voice message) which asks the driver whether the driver wants the accident processing service through the radio communication network when a breakdown or an accident is occurred. A first information transmitting and receiving section 150 which is provided in the self-checking information transmitting system of FIG. 1a provides the letter information of the accident processing service providing system which is provided through the radio communication network to a letter information displaying section 160, and provides the voice information to a voice generating section 165, and thus informs a message which asks whether the driver wants the service through the accident processing service system by letters and voices.

[0020] The driver can select the messages of the letter information displaying section 160 and the voice generating section 165, and the selection is accomplished by using a user selecting section 155. The user selecting section



155 comprises keys which informs whether the service is received or not. A signal (hereinafter, referred to as a user selecting signal) which informs a key which is operated by the user is provided to the first information transmitting and receiving section 150. The first information transmitting and receiving section 150 transmits the user selecting signal of the user selecting section 155 to the accident processing service system. The accident processing service system determines whether the accident processing service should be provided according to the user selecting signal.

[0021] In case the drivers and the passengers become unconscious by the accident, the driver cannot inform whether the accident processing service of the accident processing service system should be received. Therefore, in case the user selecting signal which informs whether the service is received or not is not provided in a time, the accident processing service with respect to the accident vehicle is compulsorily accomplished.

[0022] The self-checking information transmitting system includes a RF (Radio Frequency) signal generating section 170, and the first information transmitting and receiving section 150 operates the RF signal generating section 170 if a key of the user selecting section 155 is not inputted in a time after the letter information displaying section 160 and the voice generating section 165 are driven according to the information from the accident processing service providing system. As above-mentioned, In the case the drivers and the passengers become unconscious by the accident, the accident processing service with respect to the accident vehicle should be compulsorily accomplished. However, since the accurate of the vehicle cannot be known, a considerable time can be needed for processing the accident. The present invention uses the position information providing section 125, and the approximate location can be known by using the position information providing section 125. However, the accurate location cannot be known. In order to settle this problem, the present invention uses an RF signal which is generated in the RF signal generating section 170. Since the RF signal generating section 170 continuously generates RF signals, a vehicle which is called for the accident processing service moves to a location which corresponds to the location information according to the position information providing section 125, and traces the RF signals which are generated in the RF signal generating section 170 to reach the accident place easily.

[0023] According to the present invention, the RF signal generating section 170 is operated if the key of the user selecting section 155 is not inputted in a time after the letter information displaying section 160 and the voice generating section 165 is driven. However, the RF signal generating section 170 can be operated at the moment the accident and the breakdown of the vehicle is transferred to the accident processing service providing system through a radio communication network by the first information transmitting and receiving section 150.

[0024] The operations of the accident processing service providing system of FIG. 1b will be explained.

[0025] If the self-checking information, the present location information, and the ID information of the vehicle is transmitted through the radio communication network, the second information transmitting and receiving section 210 receives the transmitted information and provides the information to the restoring section 220 through a PSTN (Public Switched Telephone Network) or an internet network.

[0026] The restoring section 220 decodes the information which is received through the PSTN or the internet network into code data. The restoring section is connected to the user selecting information inputting section 225, the vehicle ID discriminating section 230, the location information providing section 235, and the accident grade determining section 240. The elements 225, 230, 235, and 240 can be constituted as one processor together with the accident processing service controlling section 25-.

[0027] The accident processing service controlling section 250 receives the signal which informs whether the driver receives the accident processing service. The vehicle ID discriminating section 230 receives and discriminates the vehicle ID data. The position information providing section 235 detects the present location by using the present location data, i.e., the longitude and latitude data. The accident grade determining section 240 determines the accident and breakdown grades by using the values which are detected by the ECU and the sensors. The accident grade determining section 240 combines the information about whether the vehicle is out of order, and determines the breakdown grade and provides the breakdown grade to the accident processing service controlling section 250.

[0028] If the accident grade information and the vehicle breakdown grade information is provided from the accident grade determining section 240, the accident processing service controlling section 250 provides messages about whether the vehicle accident and breakdown information is received and whether the accident processing service is received to the self-checking information transmitting system through the PSTN 215 and the second information transmitting and receiving section 210. The messages are provided to the driver through the letter information displaying section 160 and the voice generating section 165, and the driver can select the service through the user selecting section 155.

[0029] The user selecting signal which is selected in the user selecting section 155 is provided to the user selecting information inputting section 225 through the radio communication network, the second information transmitting and receiving section 210, the PSTN, and the restoring section 220. The accident processing service controlling section 250 compulsorily accomplishes the accident processing service if the information about whether the service is received is not provided from the driver in a predetermined time.

[0030] The accident processing service controlling section 250 combines the present location information which is

provided through the position information providing section 235, the accident grade which is provided from the accident grade determining section 240, and the breakdown grade information, and determines an accident processing service which corresponds to the result, and provides the result to accident processing offices, for example, an insurance company 265, an emergency center 270, and a maintenance company 275. The offices are connected to the accident processing service controlling section 250.

[0031] The accident processing service controlling section 250 is an accident processing service providing server, and includes a data base about the insurance company, the emergency center, the maintenance company, and the locations about the offices. The accident processing service controlling section 250 searches an insurance company, an emergency center, and a maintenance company which is located in the vicinity of the vehicle, and provides the information about the accident to the searched offices through the PSTN or the internet network.

[0032] IF the vehicle is out of order, the accident processing service controlling section 250 informs the insurance company 265 and the maintenance company 275 of the generation of the breakdown, and thus the emergency situation is finished. If an accident is occurred, the information about the accident should be informed to the emergency center, and the grade of the accident should be informed. A plurality of sensors 120 are detached to the vehicle, the accident grade determining section 250 determines the accident grade according to the information of the sensors and the ECU 110.

[0033] The preferred embodiment of the present invention suggests a method for determining the accident grade by using the information about the bumping portion of the vehicle, the speed of the vehicle, and whether the safety belt is fastened.

[0034] The damage degree of the passenger are various according to the bumping direction of the vehicle. The damage degree in case the front side A of the vehicle shown in FIG. 2 is bumped is the highest, and the damage degree in case the driving seat, the auxiliary seat, and the seat behind the driving seat B is the next, and the damage in case the rear side and the seat behind the auxiliary seat C is the lowest. According to the present invention, in order to detect the bumping direction, two sensors S1 to S8 are mounted on the front, rear, and both side surfaces of the vehicle, respectively.

[0035] Whether the seat belt is fastened is a main factor for determining the damage degree, and the ECU checks whether the seat belt is fastened and the speed information when the vehicle is bumped. The danger degrees of the vehicle is classified to a, b, and c. The a degree is set when the speed of the vehicle is zero to forty Km/h, and the b degree is set when the speed of the vehicle is forty one to eighty Km/h, and the c degree is set when the speed of the vehicle is over eighty one Km/h.

[0036] The information about the driver and the passenger is expected by using the bumping portion of the vehicle, the speed of the vehicle, and whether the seat belt is fastened. When the damage degree is classified to three degrees, it can be expected as shown in Table. 1.

Table.1

Whether the seat belt is fastened	Speed	Bumping position	Accident degree
Unfastened	A	A	2
Unfastened	A	B	2
Unfastened	A	C	3
Unfastened	B	A	1
Unfastened	B	B	1
Unfastened	B	C	1
Unfastened	C	A	1
Unfastened	C	B	1
Unfastened	C	C	1
Fastened	A	A	3
Fastened	A	B	3
Fastened	A	C	3
Fastened	B	A	2

Table.1 (continued)

Whether the seat belt is fastened	Speed	Bumping position	Accident degree
Fastened	B	B	2
Fastened	B	C	2
Fastened	C	A	1
Fastened	Cc	B	1
Fastened	C	C	1

[0037] In Table. 1, the accident degree 1 is a heavy accident which can bring about a serious wound or a death, and the accident degree 2 over a slight wound and under a serious wound, and the accident degree 3 is under a slight wound.

[0038] In the above-mentioned example, only the information about whether the bumping is occurred is used among the values detected by the sensors S1 to S8, but if the sensors S1 to S8 is constituted so as to the impact, the accident degree can be more specifically classified according to the impact. Further, whether the air back is mounted and other safety facilities are mounted can be another factor in determining the accident degree.

[0039] The self-checking information transferring system according to the present invention provides information about the accident and damage of the vehicle to the accident processing service providing system, and the accident processing service providing system provides a suitable accident processing service which corresponds to the accident and damage of the vehicle. Therefore, an accident can be prevented, and the life and fortune of the driver can be protected.

[0040] As stated above, a preferred embodiment of the present invention are shown and described. Although the preferred embodiment of the present invention has been described, it is understood that the present invention should not be limited to the preferred embodiment but various changes and modifications can be made by one skilled in the art within the spirit and scope of the present invention as hereinafter claimed.

### Claims

1. A system for transmitting self-checking information of a vehicle, which is mounted to the vehicle for providing an emergency situation of the vehicle to an accident processing service providing system, which comprises:

an engine control unit for detecting and providing information about traveling and breakdown of the vehicle;  
a scanner for encoding and providing the information provided from the engine control unit;  
a plurality of sensors mounted to the outside of the vehicle, for measuring and providing an impact of the vehicle;  
a position information providing section for receiving and providing information about the present location of the vehicle;  
a first data converting section for encoding and providing the information provided from the scanner, the sensors, and the position information providing section;  
a second data converting section for converting code values provided from the first data converting section to a protocol type suitable for the radio communication network transmitting; and  
a first information transmitting and receiving section for transmitting the code values provided from the second data converting section to the accident processing service providing system.

2. A system for transmitting self-checking information of a vehicle according to claim 1, further comprising: a voice generating section for generating a voice signal; a letter information displaying section for displaying a letter message; a user selecting section for determining the receiving of the accident processing service, the first information transmitting and receiving section receiving a signal for asking whether the accident processing service is received from the accident processing service providing system and controlling the voice generating section so that the voice generating section outputs the corresponding voice and controlling the letter information displaying section so that the letter information displaying section displays the corresponding letter message and providing the signal selected by the user selecting section to the accident processing service providing system.

3. A system for transmitting self-checking information of a vehicle according to claim 2, further comprising: an RF signal generating section for outputting an RF signal of a predetermined frequency bandwidth according to the control

of the first information transmitting and receiving section.

4. A system for transmitting self-checking information of a vehicle according to claim 3, wherein the first information transmitting and receiving section drives the RF signal generating section if whether the accident processing service is received is not determined in the user selecting section in a predetermined period of time after the signal for asking whether the accident processing service is received is received.
5. A system for receiving information about breakdown and accident of a vehicle from a self-checking information system of the vehicle and providing an accident processing service, which comprises:
  - a second information transmitting and receiving section for receiving information about position, breakdown, and accident of the self-checking information system of the vehicle which is transmitted through the radio communication network;
  - a restoring section for restoring and providing the information about breakdown and accident of the second information transmitting and receiving section;
  - a position information providing section for receiving and providing information about the present position of the vehicle provided from the restoring section;
  - an accident grade determining section for combining the information about accident and breakdown of the vehicle provided from the restoring section and determining and providing an accident degree and a breakdown degree; and
  - an accident processing service controlling section for determining an accident processing service according to the information about the accident and breakdown degrees and informing an accident processing office which is located in the vicinity of the vehicle
6. A system for providing an accident processing service according to claim 5, wherein the accident processing service is connected to the accident processing office through a flow net.
7. A system for providing an accident processing service according to claim 5 or 6, wherein the accident processing service controlling section provides a message which asks whether the accident processing service is received though the second transmitting and receiving section if the breakdown and accident grade information is received from the accident grade determining section, and informs the accident processing office of the accident and breakdown of the vehicle if a message which informs whether the accident processing service is not provided from the vehicle.
8. A system for providing an accident processing service according to claim 7, wherein the accident processing office is an insurance company, a hospital, or a maintenance company.
9. A system for providing an accident processing service according to claim 8, wherein the accident grade determining section determines the accident grade according to a colliding portion, the speed of the vehicle, and whether the seat belt is fastened
10. A system for providing an accident processing service according to claim 5, wherein the second information transmitting and receiving section is connected to the restoring section by a flow net.
11. A system for transmitting self-checking information and providing an accident processing service, which transmits and receives the state of a vehicle by a radio and provides a service according to the state of the vehicle, which comprises:
  - a system for transmitting self-checking information which is installed in the vehicle to transmit information about breakdown and accident of the vehicle; and
  - a system for providing an accident processing service for receiving the information about breakdown and accident of the vehicle by a radio and providing the vehicle with an accident processing service.



Fig. 1a

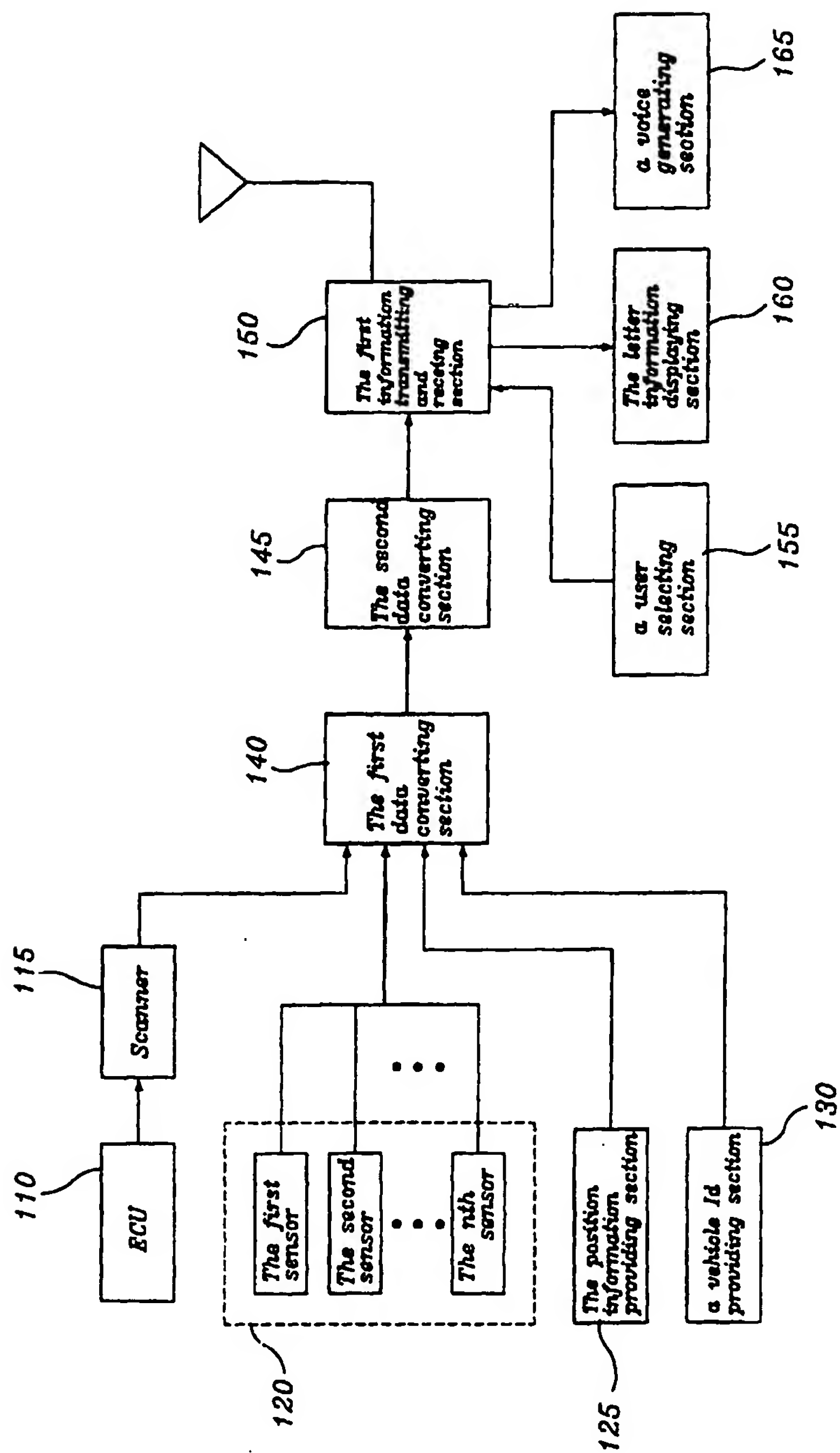


Fig. 1b

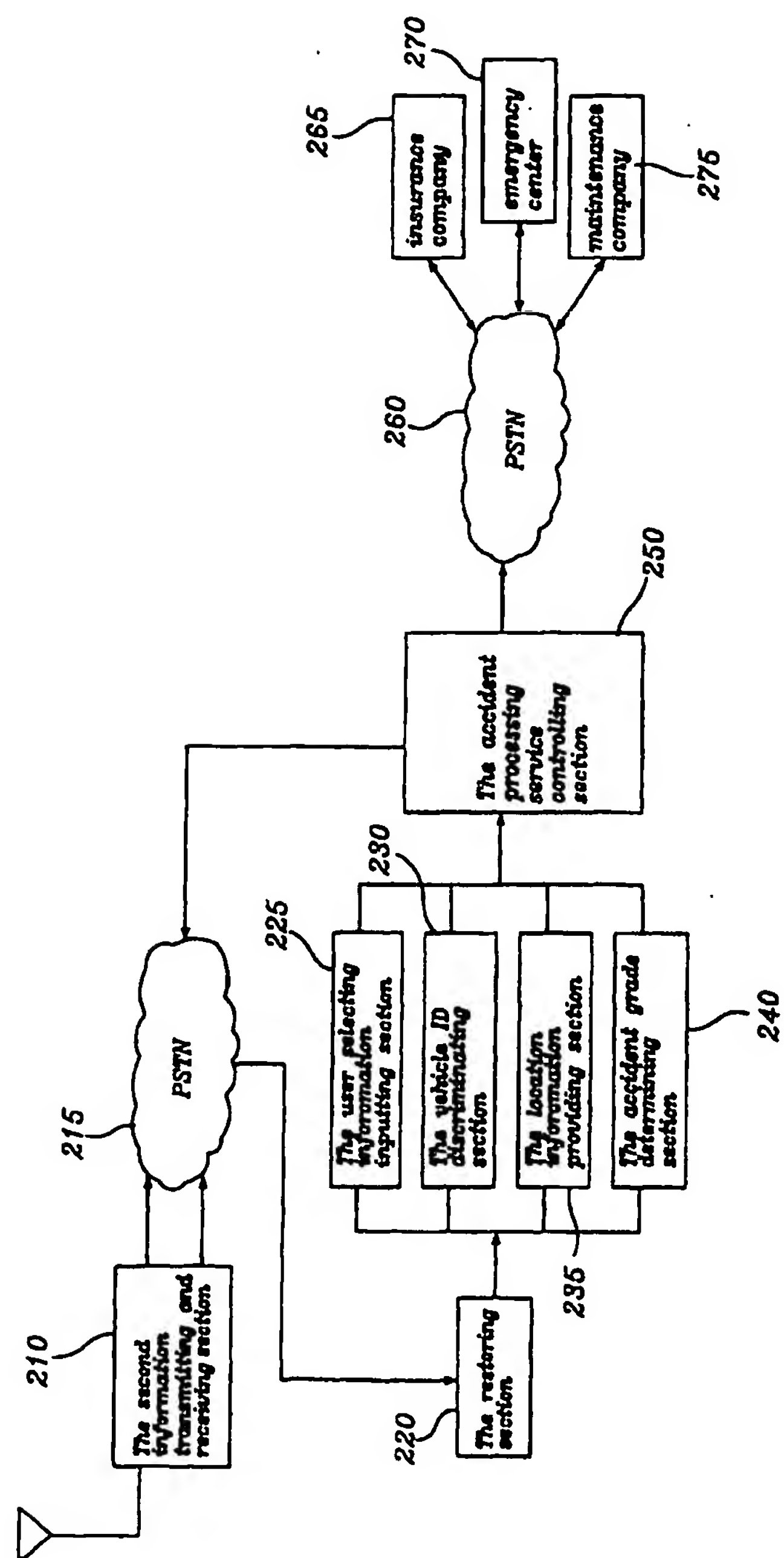


Fig. 2

